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**The Soviet BTR on the Modern European Battlefield:  
Does It Have a Place in the U.S. Army's Light Infantry?**

**A Monograph  
by  
Major Richard L. Elam  
Infantry**

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**School of Advanced Military Studies  
United States Army Command and General Staff College  
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This paper first looks at the importance of infantry tactical mobility. It touches on the evolution of mechanization in the Soviet and U.S. armies. It then examines the light infantry as it is currently organized and equipped. The examination focuses on the light infantry's roles and capabilities in a high-intensity conflict in Europe and proposes that a wheeled carrier be added to the light infantry force structure. The paper then evaluates the Soviet BTR as the candidate for becoming the light infantry's wheeled carrier. An evaluation is then made to see how the BTR will affect the light infantry in the areas of mobility, versatility, lethality, and deployability. Once this is done, the light infantry is re-evaluated to see how it might perform in a high-intensity conflict in Europe with the BTR added to its force structure.

The conclusions show that the BTR is a capable vehicle which produces positive effects on mobility, versatility, and lethality when added to the light infantry. However, the deployability of the unit is affected negatively. Even so, the paper concludes that the light infantry would be a more capable force in a high-intensity conflict in Europe with the addition of a wheeled carrier. As such, the paper recommends that some number of light infantry divisions be converted to motorized infantry.

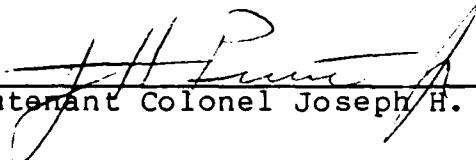
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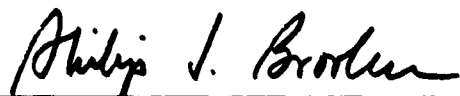
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Approved by:

  
Lieutenant Colonel Joseph H. Purvis, MPA, MMAS Monograph Director

  
Colonel William H. Janes, MA, MMAS Director, School of  
Advanced Military  
Studies

  
Philip J. Brookes, Ph.D. Director, Graduate  
Degree Program

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## ABSTRACT

THE SOVIET BTR ON THE MODERN EUROPEAN BATTLEFIELD: DOES IT HAVE A PLACE IN THE U.S. ARMY'S LIGHT INFANTRY? by Major Richard L. Elam, USA, 50 pages.

The U.S. Army created a new type division in 1983. Christened "light infantry", it was to be different from the regular infantry in the force structure at that time. The new light infantry was designed to be deployable and was to fight across the entire spectrum of war; low-, mid-, and high-intensity. To do this it was to be mobile, versatile, and lethal in addition to being deployable. The decision to utilize the light infantry early in a high-intensity conflict in Europe creates problems with retaining these characteristics.

The purpose of this monograph is to show how the addition of a wheeled infantry carrier to the U.S. Army's light infantry would create a more capable force. This is especially important if the light infantry is expected to fight and win in a high-intensity conflict on the European continent.

This paper first looks at the importance of infantry tactical mobility. It touches on the evolution of mechanization in the Soviet and U.S. armies. It then examines the light infantry as it is currently organized and equipped. The examination focuses on the light infantry's roles and capabilities in a high-intensity conflict in Europe and proposes that a wheeled carrier be added to the light infantry force structure. The paper then evaluates the Soviet BTR as the candidate for becoming the light infantry's wheeled carrier. An evaluation is then made to see how the BTR will affect the light infantry in the areas of mobility, versatility, lethality, and deployability. Once this is done, the light infantry is re-evaluated to see how it might perform in a high-intensity conflict in Europe with the BTR added to its force structure.

The conclusions show that the BTR is a capable vehicle which produces positive effects on mobility, versatility, and lethality when added to the light infantry. However, the deployability of the unit is affected negatively. Even so, the paper concludes that the light infantry would be a more capable force in a high-intensity conflict in Europe with the addition of a wheeled carrier. As such, the paper recommends that some number of light infantry divisions be converted to motorized divisions.

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## INTRODUCTION

In 1983 the United States Army announced that it would add "light" divisions to its force structure. These divisions were to be different from the regular infantry in the force structure at that time. They were to be able to fight anytime, anywhere, against any opponent; were to accomplish a wide range of missions; were to integrate technology in order to give them a crucial edge over their enemy; and were to be deployed anywhere in the world three times faster than the existing infantry divisions.(1) In other words, they were given a charter to be mobile, versatile, lethal, and deployable.(2)

Although part of the light infantry's original charter was to fight anywhere against any opponent, there could be no mistake in seeing that this lean and light force was intended primarily for low-intensity conflict. High-intensity conflict in Europe and mid-intensity conflict elsewhere in the world posed a bigger threat to our overall national security but seemed less likely to occur. Low-intensity conflict in less developed areas of the world posed less threat to our overall national security but seemed more probable. Our force structure was better prepared for the mid- and high-intensity conflict. We were less prepared to meet the most probable threat.

The British action in the Falkland Islands, Israeli

operations in Lebanon and our own Grenada operations amplified this shortcoming and were instrumental in the drive to provide our military additional ground force projection capabilities.(3) As the new light infantry divisions were activated and certified combat ready, planners began to include them in worldwide contingency plans.

It should not have come as a surprise that planners would eventually include the light infantry units in their list of early deploying forces available for employment in a high-intensity conflict in Europe (HIC/Europe). Five light divisions represented a sizeable portion of our total force structure. These divisions would be able to quickly reinforce the forward deployed units and could not be overlooked. Faced with this reality, the Army community began to determine the best way to utilize the new force in the HIC/European environment.(4) However, planners discovered many problems associated with utilizing the light infantry in a high-intensity conflict.(5)

The light infantry is not as mobile, versatile, and lethal when in the mid- to high-intensity environment. Most of the problems that planners encountered dealt with the loss of these three characteristics. The only characteristic they retain from their original charter is deployability. The central problem though, is lack of tactical mobility. This is especially crucial in a



theater such as Europe, where mobility takes on such great importance.

During a recent lecture at the School Of Advanced Military Studies, an authoritative guest speaker with first hand knowledge of the European situation stated that problems with mobility begin at the aerial port of debarkation. Inter-theater transportation assets, both air and ground, are not available nor sufficient to immediately deploy the light forces to their assigned assembly areas.(6) Once in their assembly area, each light force's higher headquarters must scramble to provide enough transportation assets to move them further. The primary cause for this is the scarcity of organic transportation assets within the light infantry division.

The light infantry has a certain amount of tactical mobility in lift helicopters. However, helicopters cannot be counted on 100% of the time because of problems with weather, enemy air defense weapons, and enemy or friendly control of airspace. The light infantry also has organic truck assets in its support structure. However, there are not enough trucks to provide the entire division total mobility. Simply put, the light infantry division cannot move itself with its combined organic transportation assets.

Once they are placed in their initial defensive positions or are placed across the forward edge of the

battle area (FEBA), light forces are virtually foot mobile. If the light infantry was fully mobile, most of the problems associated with its employment in the HIC/European environment would be solved. Full mobility would make the light infantry versatile. Further, certain vehicles could provide mobility and improve lethality. The light infantry could then fulfill its original charter completely, even in the HIC/European environment. The solution, then, is to provide tactical mobility for the light infantry forces designated for early deployment to the European theater.

The purpose of this monograph is to show how the addition of a wheeled infantry carrier to the light infantry would create a more capable force. This is important if we intend to utilize the light infantry in the HIC/European environment. I recognize that this would necessitate a new force structure as well as the development of a new vehicle. There may be more of a need to do this than we realize. If we reduce the size of the forward deployed forces, our future force must be more deployable than a heavy unit. It must also be more mobile and lethal than the current light infantry.

The decision to utilize the light infantry forces early in the HIC/European environment illuminated the mobility problem, so I will confine the text to that geographical area. Also, as mobility, versatility, lethality, and deployability are the hallmarks of the

light infantry, they will become the criteria for all evaluations. This paper will examine various topics to determine whether the addition of a wheeled infantry carrier to the light infantry makes it a more capable force.

First, we will briefly examine the importance and evolution of infantry tactical mobility. As I have said, gaining tactical mobility is key to solving the problems encountered with utilizing the light infantry in the HIC/European environment.

We will look at the light infantry next. We must determine what the light infantry is capable of doing in the HIC/European environment as they are currently organized and equipped.

Next, we will examine the vehicle that I have chosen as the prototype for providing the light infantry tactical mobility, the Soviet BTR. We must determine if the BTR is a capable vehicle before we can agree that it will solve the light infantry's tactical mobility problem.

After our examination of the BTR is complete, we will see how the addition of the BTR adds or detracts from the mobility, versatility, lethality, and deployability of the light infantry. The light infantry is bound to be affected by the addition of a major piece of equipment. We must determine the impact that it will have before declaring the BTR the right vehicle to solve

the light infantry's mobility problem.

Finally, we will examine the BTR equipped light infantry to see if it is a more capable force in the HIC/European environment. The last section will contain conclusions and recommendations.

### INFANTRY TACTICAL MOBILITY

The importance of maneuver is well understood by all soldiers. Maneuver is recognized as one of our nine principles of war.(7) The U.S. Army's AirLand Battle doctrine places great emphasis on maneuver in an effort to avoid attrition warfare. The capstone manual for AirLand Battle operations, FM 100-5, lists maneuver as one of the elements of combat power.(8) It further states that effective maneuver is dependent on mobility. No soldier appreciates tactical mobility more than the infantryman.

Ever since man climbed aboard the first chariot sometime before 2000 B.C., infantrymen have sought to carry themselves to battle by some means other than their feet.(9) Many forms of transportation have been used to carry infantrymen to battle since that first chariot, but for the most part they continued to rely on foot mobility during close combat. The tempo of battle never demanded anything faster than the walking or running pace of a man and infantry was seldom used or

needed during the pursuit phase. This changed before World War II.

The tank dramatically increased the tempo of close battle and pursuit. Nevertheless, even with speed and lethality, the tank still needed infantry for protection. However, the infantry could not keep up on foot. Armies of the world approached the problem in many ways, but for our purposes we need only be concerned with two, the Soviet Union and the United States.

Newsreels and photographs from the World War II era leave us with the impression that the Soviet Union's answer to providing infantrymen with tactical mobility was to crowd soldiers on top of tanks. On the contrary, the Soviets were working on the problem as early as the mid 1920's during joint German-Soviet trials. They had even formed some mechanized units before the start of the war.(10) Time was not an ally, however, and the Soviets entered World War II without a standard infantry carrier. They had an abundance of infantry manpower to support their tanks but no vehicle to provide tactical mobility. Thus, the expedient of placing the supporting infantry on the outside of the tanks was used. This was not the intended long term solution to the infantry's tactical mobility problem, but the Soviets could do little to change things.

The USSR had its hands full holding back the German

invasion and even though an infantry carrier was desperately needed, they had little time or inclination to develop one. As a result, no true infantry carrier emerged from World War II. In fact, the Soviet army continued to rely heavily on horse transport, foot mobility, and infantrymen riding on the top of tanks throughout the war.(11) The Soviets had no reason to believe that future wars in Europe would be any different than the one just fought, so they began to remedy the infantry's tactical mobility problem.

After World War II, the Soviets continued to work on a solution to transport all of their infantry. They accomplished this during 1954-1963 and designated their new force as motorized rifle infantry.(12) They made a conscious decision to develop a wheeled and a tracked version of the infantry carrier. The wheeled BTR-152 and the tracked BTR-50 were both produced in the early 1950's and became the standard vehicles for the Soviet motorized forces. This pattern of having wheeled and tracked units has continued and is reflected in the current Soviet motorized rifle concept.

Today, the ratio of wheeled motorized rifle units to tracked is roughly 2 to 1.(13) The wheeled vehicle is the four axle, eight wheeled bronetransportir (BTR). It has a crew of 2 and can carry 9-14 passengers. There are three versions of the BTR in the current force structure; the BTR-60, BTR-70, and BTR-80. All have

similar features and characteristics.(14) Improvements have been made with the fielding of each successive vehicle. However, the most radical changes were made on the BTR-80. It has one diesel powered engine versus the two gasoline powered engines in the BTR-60 and the BTR-70. The BTR-80 has exit doors on the side as well as top hatches. The BTR-60 and the BTR-70 are limited to top hatches. This is only one version of transportation used in the Soviet motorized rifle units.

The tracked version of infantry carrier used by the Soviets today, the bronevaya maschina piekhota (BMP), is actually an infantry fighting vehicle. Infantry troops dismount from the BMP only when absolutely necessary. They fight while inside the vehicle as much as possible. Their primary mission is to support tanks. There are currently two models in the Soviet inventory, the BMP-1 and the BMP-2.(15)

BTRs and BMPs are mixed within the motorized rifle division. There are two wheeled regiments, commonly referred to as BTR regiments, and one tracked regiment, commonly referred to as a BMP regiment. Contrary to popular belief, the Soviets are not replacing their BTR regiments with BMP regiments.(16) Rather, the production of the BTR-80 sends a clear signal that the wheeled infantry carrier is an important part of the Soviet motorized concept of today and the future. With a force structure such as this in place, the Soviets

will definitely fight in the HIC/European environment with infantry mounted on the wheeled BTR.

The United States Army faced the same problem as the Soviet Union in providing the infantry with tactical mobility before the outbreak of World War II. Unlike the Soviet Union, the United States did a good job in balancing mechanized infantry and tank units before the war.(17) The M3 half-track was produced and fielded shortly before the outbreak of hostilities. Thus, an infantry carrier capable of matching the tempo set by tank warfare was available. Time was also available. The late date in which we entered the war, coupled with the time we took to prepare and mobilize before actually deploying troops into battle, allowed us to design and equip a mechanized force to complement the tank force.

The United States continued to provide the infantry with the means to gain tactical mobility commensurate with the mission. It was the U.S. Army that fielded the first fully enclosed tracked personnel carrier, the M52. Further research and development yielded the M113 tracked, armored personnel carrier in 1962.(18) The M113 remained the primary infantry carrier until the M1 Abrams tank was introduced into the force structure in 1981. The M113 could not keep up with the speedy Abrams though, and since tanks still needed the infantry for protection, a new vehicle was required. The result was the M2 Bradley. It is more than just a carrier. Like



the Soviet BMP, it is an infantry fighting vehicle. Unlike the Soviets though, the United States will replace all M113s with the M2 Bradley fighting vehicle as it becomes available. There was never any intent to have more than one type of infantry carrier in the mechanized force structure. As soon as all M113s have been replaced, this will become reality.

With the production of the M2 Bradley, it seemed that the United States had solved its tactical mobility problem for the mechanized infantry. It was generally accepted that specialized infantry, such as airborne, air assault, and special forces did not need the same degree of tactical mobility as those units fighting in the HIC/European environment. The decision to field five light infantry divisions and use them early in the HIC/European environment changes that. The fact that the light divisions make up a sizeable portion of our total force structure gives us no choice but to employ them across the entire spectrum of war. But what can we expect from the light forces in this high-intensity environment? We can determine the answer by examining the light infantry's capabilities in the HIC/European environment as they are currently organized and equipped.

## LIGHT INFANTRY IN EUROPE

The debate on how to use the light infantry in the HIC/European environment continues unabated. The obvious approach is to use them in those roles that have always been best suited for dismounted light infantry. In this case we are talking about fighting in compartmented and forested terrain, in urban and built up areas, and in mountains or other places where trafficability of mechanized or armored forces is difficult. These areas take away some of the mechanized or armored force's tactical mobility advantage while providing the light infantry some degree of survivability. Typical missions would be to seize or defend choke points, key road intersections, bridges, or logistics facilities. Infiltration or air assault would be crucial to any offensive operation. This is a bottom-up view of how to use light infantry in the HIC/European environment.

A better approach is expressed by Brigadier General Hubba Wass de Czege in his study, "Employment Concepts For The Light Infantry In Europe." He approaches the question from a top-down view.(19) BG Wass de Czege sets forth a guiding principle for the use of light infantry in the HIC/European environment. He says that they should be used to complement other maneuver forces within the combined arms system, rather than as a substitute. He further states that there are generally

two types of missions for the light infantry in Europe. One is to use a light infantry division to replace all or a portion of a heavy division in its defensive sector in order to free the heavy division as a corps counterattack force. The other mission would be in a "complementary role" such as; a screening or covering force, as a rear area combat operations (RACO) force, or in "various offensive missions." (20) BG Wass de Czege's study does not address the threat that the light infantry is likely to encounter when performing these missions.

Each of these missions, with the possible exception of the RACO mission, would most likely involve a threat force of at least a BTR equipped motorized rifle unit. The RACO force will most likely face a mechanized unit. The Soviet airborne forces which will likely appear in our rear areas may be mechanized once employed. In 1970 the Soviets produced a tracked airborne infantry combat vehicle, the pronevaya mashina desantnaya (BMD). It is a lighter and smaller version of the BMP and it is air-droppable. They have enough BMDs to completely mechanize the Guards airborne divisions. (21) It appears that the Soviet airborne will also airdrop self-propelled assault guns and light trucks. Every force that the light infantry will likely face will be mounted on a wheeled or tracked fighting vehicle.

In each of the recommended roles for the light

infantry in the HIC/European environment, the threat will have excellent tactical mobility. We must determine what can be expected of the light infantry in this situation. The best way to answer this is by examining the light infantry while using the criteria of mobility, versatility, lethality, and deployability.

The light infantry division has three types of organic mobility: foot, truck, and helicopter. Foot mobility is the only organic mobility asset that the light infantry division can depend on 100% of the time. The primary factor that must be considered in this instance is the weight that each soldier is capable of carrying. Light infantrymen would like to have as much ammunition and as many weapons with them as possible. However, the light infantryman has to be very selective and must prioritize his load. The load that each soldier ultimately carries is usually limited to 50 pounds.(22) The only food, water, ammunition, and weapons he will have in combat will likely be what he can carry on his back.

The truck is the second type of organic mobility. The light infantry division has one transportation motor transport (TMT) company organic to its supply and transportation battalion. By dedicating all of its truck assets to moving only troops, the TMT company can move one light infantry battalion at a time.(23) These trucks may not always be available to transport troops.

They may have to be used to transport supplies. But, there are other ways to move troops by wheeled vehicles.

One way is to use the light truck known as the high mobility, multi-purpose wheeled vehicle (HMMWV). Major Richard J. Marchant calculates that the light infantry division can move one battalion by pooling all of its HMMWVs.(24) This could only be done on rare occasions and under extreme circumstances. But, this gives the division the capability to transport two battalions when executed in conjunction with the TMT company.

If all of the division's organic wheeled vehicles were used to transport troops, only two battalions of light infantry could be moved. As radical as it sounds, the light infantry must be prepared to pool all wheeled assets under extreme situations. Taking these extreme measures still leaves seven battalions of light infantry without transportation. This brings us to the light infantry's last organic transportation asset.

The third type of organic mobility that the light infantry division has is the helicopter. The combat aviation brigade of each light infantry division has two assault helicopter companies with fifteen UH-60 Blackhawks each.(25) Aviation units plan for a 75% aircraft availability rate for each mission.(26) Using this figure, the division's 23 helicopters can lift 253 troops at one time if the maximum capacity of 11 passengers per helicopter is used. This will not move

three rifle companies with a combined aggregate strength of 390 soldiers. However, if the troop seats of the UH-60 are removed, the aircraft load is increased to 25 troops.(27) The 23 helicopters can now carry 575 troops at one time. This exceeds the aggregate battalion strength of 559. When these measures are taken, the division has the capability to transport one battalion of light infantry by air.

If all available organic wheel assets and all organic lift helicopters were used at once, the light infantry division could move three battalions. This is quite an accomplishment in itself. However, it still leaves six battalions with no more tactical mobility than that which can be provided by the infantryman himself. The evident conclusion is that the light infantry has poor mobility. This is significant when you consider that every other unit operating in the same environment, both friendly and enemy, has 100% wheeled or track mobility. The light infantry becomes a static force in every mission which BG Wass de Czege envisions in the HIC/European environment. This might be acceptable in an economy of force role or as a screening or covering force; but only in compartmented, heavily forested, or urbanized terrain. This is not the case when used as a RACO force and in most offensive operations. The light infantry's ability to fix and defeat a mobile enemy force is questionable when only

three battalions out of nine, at best, have some degree of tactical mobility.

Versatile can be defined as, "embracing a variety of subjects, fields, or skills; having many uses or applications." (28) In a strictly military sense, versatility means being capable across a broad spectrum. (29) The strength of the light infantry is versatility at the strategic level. The light infantry is strategically deployable and can fight across the entire spectrum of war; low-, mid-, and high-intensity. We are concerned with their versatility in the HIC/European environment.

BG Wass de Czege emphasizes a need for three types of infantry in Europe. Infantry is needed to secure tanks and to insure their rapid advance. Infantry is also needed to fight from strong points and assault strong points while supported by tanks. Finally, infantry is needed to screen, cover, or defend highly compartmented, forested terrain; to infiltrate; and to conduct air assaults. (30) The light infantry is well suited for this last role. However, their lack of tactical mobility restricts them to only this role. Mounted infantry would be able to act in any of the three roles by dismounting troops when necessary. A truly versatile infantry in the HIC/European environment is one that can perform all three roles, even if there is slight degradation in one or two. The lack of

tactical mobility is not the only factor that makes light infantry less versatile.

Lethality can also determine whether a force is versatile or not. We will restrict our examination of lethality to the battalion level. This is the fighting element of the division that is expected to close with and destroy the enemy. It is also the fighting element that depends mostly on foot mobility.

The most potent weapon that the light infantryman has is the TOW antitank missile. The only other weapon available to the light infantryman that can kill tanks or armored personnel carriers is the medium antitank weapon (MAW). There are 4 TOW launchers and 18 MAW launchers in each battalion. The heaviest machine gun in the light infantry battalion is the 7.62 M-60. The remaining fire power in the light infantry battalion is derived from light machine guns, light mortars and small caliber personal weapons. This is not a very lethal force in the HIC/European environment.

The light infantry battalion can fire a total of 140 TOW and MAW antitank missiles with their basic load. If it faces a Soviet motorized rifle regiment in the defense, it must defeat 160 armored vehicles.(31) If each missile were to destroy one armored vehicle, there would still be 20 enemy vehicles left to fight. This best case marksmanship and kill ratio is highly improbable. But even if it were possible, the 20



remaining vehicles easily represent 2 tank or motorized rifle companies. This is a potent force against a dismounted infantry battalion without antitank ammunition.

The light infantry division is deployable. It was designed to conform to a manning level of approximately 10,000 soldiers and was to be deployed in 500 C-141 aircraft sorties. The current authorized strength for the light infantry division is 10,762 personnel and it can be deployed in 520 C-141 equivalent aircraft sorties.(32) It would take about a week to deploy the entire division using all available aircraft.(33) However, the problems begin at the aerial port of debarkation.

As stated before, the division is not capable of transporting itself in one move with organic vehicles. Corps or theater assets will have to be used to transport the light infantry division forward of the aerial port of debarkation. The tactical mobility problem surfaces again once the light infantry arrives at the drop off point. We come full circle when we first give the light infantry tactical mobility only to take it away when that non-organic vehicle drives or flies away.

What have we determined about the light infantry as currently organized? When placed in the HIC/European environment, the light infantry has major shortfalls.

It no longer meets the criteria set forth in its original charter. It lacks the tactical mobility needed in this highly mechanized environment. Furthermore, the light infantry has little versatility. This is especially true when we consider BG Wass de Czege's three requirements for infantry. The lethality of the light infantry is insufficient based on the most likely enemy threat. There are not enough organic antitank launchers and missiles to kill the expected number of threat vehicles. The one strong suit is deployability. We can get a light division to the European continent and can get it there relatively fast. However, the value of a force with these particular shortfalls in this environment is questionable. How can this difficult dilemma be solved? My proposal is to add the Soviet BTR to the light infantry force structure. In order to evaluate this proposal, we need to examine the mobility, versatility, lethality, and deployability of the BTR.

#### TACTICAL MOBILITY OF THE BTR

The decision to use the BTR as the light infantry carrier may seem strange to many and a more detailed explanation is warranted before our evaluation begins. First, why did I choose a wheeled personnel carrier instead of a tracked vehicle? It is my personal belief

that the Army has a tendency to try to use tracked personnel carriers as fighting vehicles.(34) The U.S. Army does not need another tracked fighting vehicle. We currently have one of the best in the M2 Bradley Infantry Fighting Vehicle. The esprit de corps and the aura of eliteness that comes with being light infantry is unique and important. It would be destroyed if light forces were required to fight primarily from a vehicle instead of fighting dismounted, supported by a vehicle. Additionally, wheeled vehicles are cheaper to develop and cost less to maintain and operate.(35) If this is the case, then why not a truck or one of the many other wheeled infantry carriers in existence today?

A truck may help the tactical mobility problem, but it does not solve it. Trucks have none of the characteristics that make wheeled infantry carriers the vehicle of choice. They offer no protection from direct or indirect fire, they cannot swim water obstacles, and they have very limited off road, cross country mobility. The choice of the BTR over the world's other wheeled carriers resulted from my continuous study of the Soviet threat while at the Command and General Staff College and the School of the Advanced Military Studies.

The abundance of BTRs in the Soviet force structure has always sparked a certain amount of my curiosity. I wanted to examine the BTR closely to see why the Soviets continue to field it. As Sun Tzu said, "Know your enemy

and know yourself; in a hundred battles you will never be in peril."(36) The most likely foe of the light infantry in the HIC/European scenario will be a Soviet equipped motorized rifle unit.(37) It is highly probable that light forces will face a BTR equipped motorized rifle unit given the preponderance of the same within the Warsaw Pact forces.(38) Since this is the enemy wheeled vehicle that the light infantry will probably face in the HIC/European environment, it warrants evaluation as the first choice candidate. These are the reasons why I chose the BTR as the prototype for the light infantry carrier.

Three specific characteristics are key in determining a combat vehicle's tactical mobility. They are the vehicle's ability to negotiate water obstacles, the vehicle's ability to operate off road, and the vehicle's ability to make lengthy road marches along highways and secondary roads.(39) We will evaluate the BTR's tactical mobility based on these three characteristics.

The BTR meets the generally accepted standards for swimming combat vehicles.(40) The long, boat shaped hull makes it ideal for water operations. A single hydrojet powers the BTR in the water and stabilization is provided by a trim vane under its nose. The BTR can reach speeds of 9-10 km/hr while in the water. When making a river crossing, the exit banks must not have a

slope greater than 6-10 degrees. If the banks are too steep for the BTR to make it out under its own power, the winch on the front of the vehicle is available for extraction purposes. Drivers are taught to steer for trees and stumps on the far side of the river if they are at an unprepared crossing site. All actions that need to be accomplished before entering the water can be performed by the driver while on the move. The vehicle can continue its mission after exiting the water, but some post operations checks must be made at the first halt.(41)

The BTR meets the generally accepted standards required for off road, cross country operations.(42) Many factors must be considered when a vehicle is taken off road. The vehicle will encounter vertical obstacles, man-made and natural ditches, slopes of varying degree, and soils of varying consistency. The BTR can cross a vertical obstacle of 1.3 feet and traverse a tank ditch of up to 6.5 feet. It can negotiate slopes of up to 30 degrees and has a turning radius of 39.3 feet.(43) The BTR's eight tires are foam and air filled. The pressure of the tires can be controlled from the driver's seat inside the vehicle. Tires can be inflated and deflated while on the move. This gives the BTR the capability to move through swampy and marshy terrain to some degree if necessary. Having wheels on a combat vehicle is not as odd as it sounds.

The BTR can continue to move even on flat tires. The excellent off road capabilities of the BTR are best exemplified by the fact that 90% of the terrain in Europe that can be negotiated by a tracked vehicle can also be negotiated by the BTR.(44)

The BTR is fully capable of making lengthy road marches over highways and secondary roads. With its fuel capacity of 59-61 gallons it can cruise from 248-310 miles at speeds of up to 52 miles an hour. The high and low figures depend on the vehicle model. Because it is a wheeled vehicle, the BTR will do less damage to paved and hard surface roads. Its relatively narrow width will allow it to maneuver over secondary roads and through the many small villages of Europe. Since it is lighter, the BTR can cross more bridges than a tracked vehicle. Crew and passenger rest is the only major concern for the BTR when making a lengthy road march. Convoy integrity is easily maintained due to infrequent engine and suspension failures.(45) Rest breaks will slow or stop the BTR more often than mechanical factors of the vehicle itself.

The fact that the BTR is highly mobile makes it an invaluable asset in Europe. The excellent road network, both autobahns and secondary roads, is ideal for a wheeled vehicle like the BTR. The many rivers and streams in Europe do not pose significant problems. The all-wheel drive and excellent off road capabilities of

the BTR are an added bonus should the BTR be forced to move cross country. Mobility is only one aspect of our evaluation, though. Versatility, lethality, and deployability are also important if the BTR is to be used by the light infantry.

#### VERSATILITY, LETHALITY, AND DEPLOYABILITY OF THE BTR

Although the BTR is primarily a troop carrier, it can be modified to function in many capacities. The most common use other than as a troop carrier is as a command and control vehicle. When used in this manner the principle modification is in the communications area. Radios and antennas are added. The command vehicle version has a raised canvas top, map tables and a generator. A plexiglas window replaces the machine guns in the turret of the forward air controller version. Although the Soviets do not currently modify the vehicle as such, the BTR can serve as a weapons platform for various systems.

The Soviets experimented with a mortar carrier version, but it was never fielded. They also mounted a 76mm gun and an automatic 37mm cannon in the early 1960s. This could have been a forerunner of the BMP.(46) A Rumanian version of the BTR, the TAB SP, mounts an 82mm mortar. The Angolan version of the BTR-

60PB is sometimes found carrying two SA-13 surface to air missile (SAM) canisters.(47) As you can see, the Soviet BTR presently functions in many different capacities. The possibilities that exist for other roles make it a very versatile vehicle.

The BTR is fairly lethal for a wheeled vehicle. It has two of the Soviet Union's most durable machine guns mounted in the turret. The most powerful of the two is the 14.5mm KPVT. It has an effective range of 2000 meters and can fire at the rate of 600 rounds a minute. The armor-piercing round of the 14.5mm KPVT can penetrate 32mm of armor at a range of 500 meters and 20mm at 1000 meters.(48) This means that it can penetrate the armor of other BTRs and some of the armor on a BMP at both ranges.

The other machine gun, mounted coaxially, is the 7.62mm PKT. It has an effective range of 1500 meters and can fire 650 rounds per minute. It can penetrate 8mm of armor with its armor-piercing round fired from 500 meters.(49) Although this will not allow it to defeat any armored vehicles, the PKT can defeat trucks and other thin skinned vehicles.

The BTR has stowage space for two AGS-17 automatic grenade launchers. The AGS-17 can also be mounted on the outside of the vehicle and fired from the inside.(50) It fires a high explosive fragmentation round at a cyclical rate of 400 rounds a minute. The



practical range of the AGS-17 is 800-1200 meters. The BTR also has stowage space for light antitank weapons. It can carry medium and heavy antitank guided missiles at the expense of one or two passengers.

The BTR would do well against the current array of Soviet vehicles, especially the BMP and other BTRs. It can defeat a variety of thin skinned and lightly armored vehicles with its two turret mounted machine guns and can carry antitank guided missile launchers heavy enough to defeat most heavily armored vehicles.

The BTR has relatively compact dimensions for an armored personnel carrier. Because of this, it can be deployed in all U.S. Air Force transport aircraft. Weight becomes the primary limiting factor when transporting the BTR by air. Three BTR-60s and two BTR-70/80s can be transported in the C-141.(51) Like all other combat vehicles, the BTR is easily transported by ship.

The BTR measures up well against our criteria of versatility, lethality, and deployability. The fact that it can perform as a troop carrier, command and control vehicle, and as a weapons platform makes it versatile. The BTR's 14.5mm KPVT can defeat most of the vehicles that it will face on the battlefield. This alone makes it lethal. The BTR becomes even more lethal when you consider its ability to mount automatic grenade launchers and carry antitank guided missiles.

Finally, the BTR can be deployed in the C-141 and can be transported by ship. All of this, plus mobility, speaks well of the BTR as a combat vehicle. However, one more evaluation must be made before declaring it the right vehicle for the light infantry. We must determine how the addition of the BTR affects the light infantry's original charter.

#### THE BTR EQUIPPED LIGHT INFANTRY

Additions and deletions of equipment or personnel to and from any force structure will always create a ripple effect. My proposal to mount every light infantryman at battalion level and below in a BTR would require changes to be made throughout the light infantry division, particularly in the logistics community. Mechanics, recovery vehicles, fuel trucks and more would have to be added to the force structure. These are significant changes and I do not take them lightly. However, our primary focus must be on the addition of the BTR to the infantry battalions, and the resulting impact on the light infantry's original charter.

The addition of the BTR to the light infantry force structure would provide tactical mobility. The fact that light infantry has any vehicle at all at their disposal 100% of the time improves tactical mobility. But the excellent mobility of the BTR, especially on the

roads and cross country in Europe, will give them tactical mobility commensurate with any mounted force. The effect of the BTR on the light infantry's charter is definitely positive in this key area. There is also a positive effect on versatility and lethality.

Versatility for the light infantry in the HIC/European environment is largely determined by its mobility and lethality. Therefore, we must first determine how the addition of the BTR affects lethality. The light infantry becomes more of a lethal force than one might expect with the addition of the BTR. Richard E. Simpkin makes a correlation between armored vehicles and fighting power of the front line combat soldier. He believes that the fighting power of the combat soldier is trebled by the addition of a suitable mix of armored vehicles.(52) Although Mr. Simpkin is obviously talking about adding tanks to mechanized infantry, the correlation can also be made by adding armored personnel carriers to light infantry. It might be misleading to say that the fighting power of each light infantryman will be trebled, but the light infantry will certainly gain some degree of lethality with the addition of the BTR.

The capability of the BTR to carry antitank guided missiles makes the light infantry force even more lethal. The fact that the vehicle can carry antitank mines, antipersonnel mines, and other explosives was not

discussed earlier. Because the light infantry soldier cannot carry these in sufficient quantities now, the availability of these munitions further increases the lethality of the force. Just how will this tactical mobility and increased lethality affect versatility?

Light infantry mounted on BTRs would have the versatility needed to accomplish the full range of missions being proposed for them in the HIC/European environment. They could perform an economy of force mission for a heavy division much better with their added lethality. They could perform a mobile screen or covering force mission instead of a static one. The light infantry would be better suited for RACO missions with their greater lethality and tactical mobility. They would be able to react immediately and move 100% of their combat force by not having to rely on non-organic air and truck transportation assets. They would be able to fix and defeat a mounted Soviet airborne force, since they would have commensurate tactical mobility and firepower. Tactical mobility and added lethality would allow the light infantry to perform the "various offensive missions" with the heavy forces rather than before them (infiltration), in front of them (air assault), and behind them (mop up). Since the current light infantry excels in dismounted operations, so must the BTR mounted light infantry.

Dismounted operations are important and some force

must have that capability. Light infantry equipped with the BTR could still perform dismounted missions. The great benefit is that they would not be limited to only this type mission.

The BTR will not hinder the light infantry's original charter to be mobile, versatile, and lethal. Instead, the addition actually enhances capabilities. Deployability of the BTR equipped light infantry becomes a problem, however.

Even though the BTR itself is deployable, it has an adverse effect on the ability of the light infantry division to be deployed in 520 C-141 sorties. Earlier, we limited our discussion to the fighting elements of the light infantry division, the infantry battalions. If the light infantry division is equipped with enough BTRs to transport everyone at infantry battalion level and below, a total of 576 BTRs will be needed.(53) A C-141 can transport 3 BTR-60's and 2 BTR-70/80's. Using the lower figure of 2 vehicles per C-141, it would take 288 sorties just to transport the BTRs. The division would then need 808 sorties to deploy. This number does not take into consideration the additional fuel and maintenance vehicles needed to support the BTRs. We can arrive at a more accurate figure using the current U.S. Army motorized division's deployment data. This would bring the required number of C-141 sorties to move the BTR equipped light infantry division to 1445.(54) This

number would include required maintenance and fuel vehicles and is more realistic. Even so, we must conclude that the BTR equipped light infantry would not meet the original charter to be deployed in 500 C-141 sorties.

The addition of the BTR will affect the light infantry's original charter to be mobile, versatile, lethal, and deployable in various ways. While it enhances the light infantry's capabilities for the first three, it severely detracts from the light infantry's ability to deploy quickly. Now that we know what the BTR can do and how it affects the light infantry, we need to re-examine the light infantry's overall capabilities in the HIC/European environment when equipped with the BTR.

#### LIGHT INFANTRY IN EUROPE: EQUIPPED WITH THE BTR

Thus far we have determined what can be expected of the light infantry in the HIC/European environment as units are currently equipped. We have also determined that the BTR is a mobile, versatile, lethal, and deployable vehicle. We determined that the light infantry equipped with the BTR would be mobile, versatile, and lethal but not deployable in the required number of C-141 sorties. Let us now return to the HIC/European environment and determine what we can

expect from the BTR equipped light infantry.

Given the capability to move 100% of their combat troops at any time, the light infantry becomes more than just a tactically mobile force. Once deployed to Europe with their vehicles, the BTR equipped light infantry becomes operationally mobile. They would no longer have to depend on outside sources to pick them up at the aerial port of debarkation and move them to their forward assembly area. We have already stated that the BTR equipped light infantry would be as tactically mobile as any other mounted force in Europe. When we add the ability to conduct air mobile operations, to infiltrate, and to move dismounted, the BTR equipped light infantry would actually have an edge in tactical mobility.

The lethality that the light infantry would gain from the addition of the BTR would enable them to stand and fight heavy forces. The 14.7mm KPVT would be able to defeat other BTRs as well as BMPs and BMDs. The added carrying capability would give the light forces a great deal of tank killing potential. The BTR equipped light infantry could defeat both BTR and BMP equipped motorized rifle units and could hold ground against an attacking Soviet armored force.

The combination of mobility and lethality would provide the versatility to better perform missions currently being proposed. But true versatility would

come from the new missions that the light infantry would be able to accomplish, not just those proposed missions which could be performed to a higher degree. The light infantry equipped with the BTR could perform each of the three roles that BG Wass de Czege describes. They could work closely with tanks to insure a rapid advance and to provide security. The Soviets will do this by placing BTR equipped motorized rifle forces in the first echelon of attacking formations. The BTR equipped light infantry could fight from strong points and assault strong points when supported by tanks. This is the infantry role that BG Wass de Czege says is important in Europe; one which we currently have no infantry force capable of doing well.(55) The increased lethality and ability to carry demolitions makes the BTR equipped light infantry ideal for this role. In the third role, the BTR equipped light infantry could still screen, cover, or defend highly compartmented, forested terrain, and could dismount to infiltrate and conduct air assaults. Finally, the BTR equipped light infantry could be expected to perform missions in the HIC/European environment that the current light infantry cannot perform. These are delay and retrograde operations, reconnaissance missions, and counterattacks. Given the mobility and lethality discussed, BTR equipped light infantry could perform them well.

The deployability issue comes down to a trade off



between time and lethality of the force that finally arrives. We determined earlier that 1445 C-141 sorties is a realistic number for deploying the BTR equipped light infantry division. The difference between the time it takes a current light infantry division in 520 sorties to close on its aerial port of debarkation and for a BTR equipped light infantry division to do the same in 1445 sorties is 6 or 7 days.(56) These figures are based on using the entire C-141 fleet. When the total C-141 fleet is not available, the time it takes to deploy the BTR equipped light infantry will increase. However, this is also true for the current light infantry and any other force being deployed by air.

The mobile, versatile, and lethal force that is gained with this additional time is an acceptable trade off considering the threat that it will face.(57) The BTR equipped light infantry could deploy without vehicles under extreme situations. They would only have to fight 6 or 7 days without vehicles. Other solutions are possible before going to this extreme. The division could depart the United States without vehicles and draw BTRs at a pre-positioning of material configured to unit sets (POMCUS) site. They could also deploy in brigade slices. A light infantry brigade equipped with the BTR is likely to be more lethal than a light infantry division without the BTR.(58)

A light infantry force equipped with the BTR

would be more valuable in the HIC/European environment than one as currently organized and equipped. It would not require augmentation. It would become a mobile asset to the corps. It would be able to perform in various roles and could be assigned more missions than can be given to the current light infantry. Waiting the extra week for a BTR equipped light infantry force would be worthwhile.

#### CONCLUSIONS

This monograph has evaluated the current light infantry's capability to fight in the HIC/European environment. Analysis has been based on mobility, versatility, lethality, and deployability. These were the characteristics given as a mandate when the light infantry was formed in 1984. We determined something about these characteristics when we looked at the current light infantry's capabilities in the HIC/European environment. We found that they have diverse meanings when they are applied to the three intensity levels of warfare. We can assume that the light infantry as currently equipped and organized is probably mobile, versatile, and lethal with respect to most low-intensity conflicts. However, the analysis in this monograph has shown that the light infantry as currently equipped is not mobile, versatile, or lethal

when deployed early in the HIC/European environment.

In looking at the light infantry's current capabilities in the HIC/European environment it was evident that they lacked tactical mobility. With strategic deployability in mind, the original intent was to keep the light infantry foot mobile. Organic trucks and helicopters will give the light infantry the tactical mobility required in a low- and mid-intensity environment. The tempo in these two environments does not require anything greater than foot mobility. Furthermore, the combat environment will allow the time it takes organic assets to move units in multiple lifts and trips. But time requirements are reduced in the HIC/European environment. There is not enough organic transportation within the division to move all light infantry battalions at once. Dependence on outside augmentation for transportation assets makes the division less flexible. Even if enough helicopters are secured to move the entire division at once, poor weather or enemy air and air defense may hamper operations.

In any mission given to the light infantry in their current form, they become immobile once emplaced. Even though the light infantry can be expected to perform well in an economy of force role in compartmented or heavily forested terrain, they would be easily fixed or bypassed. This does not sound like a versatile force.

The lightness of the force is a hindrance when lethality is considered. They cannot carry heavy caliber weapons in any great number. Without tactical mobility, the light infantry is even less versatile and lethal. These conditions will not allow the light infantry to fight the expected threat and survive, let alone win. Light infantry used in this manner could only be used once if a great number of casualties were taken. Replacement infantrymen will not possess the requisite light infantry skills. As a result, the light infantry would lose all semblance of its original form.

There is no denying that the light infantry is deployable. They will be able to get to the European theater in roughly the number of C-141 sorties that the original charter demands. However, the value of the force that gets there is questionable.

I chose the BTR as the prototype model for the light infantry because it is currently the most common wheeled vehicle, threat or friendly, found in that part of the world today. Analysis has shown that it is mobile, versatile, lethal, and deployable. Over all, the Soviet BTR is a more than capable infantry carrier. The Soviets' production and fielding of the BTR-80 sends a clear signal that they think it is a capable infantry carrier for the HIC/European environment.

Adding a wheeled infantry carrier to the light infantry force structure has a definite impact on the

original charter. The addition of the BTR enhances the light infantry's mobility, versatility, and lethality. However, it detracts from the original mandate to be deployable in 500 C-141 sorties. The BTR equipped light infantry can still be deployed in a reasonable time, though. It may be worth waiting an extra week, or longer if necessary, for a division that can successfully engage a Soviet motorized rifle or tank division and still be able to fight another day. The capabilities of the light infantry when equipped with the BTR are more in line with those required in the HIC/European environment. Equipped with the BTR, the light infantry can perform virtually any mission expected of a heavy division. They become somewhat of a bonus by being able to perform mobile, offensive missions. The light infantry equipped with the BTR would not be restricted to a handful of missions, mostly defensive in nature, as they are under current proposals.

This brings us to the issue of converting light infantry forces to motorized infantry. Five light infantry divisions, an air assault division, and an airborne division is an excessive number for low-intensity conflict. Considering the highly mobile and lethal threat that the light infantry will face in Europe, perhaps a motorized infantry force of some size is required. The U.S. Army should consider converting

some number of these divisions to BTR equipped light infantry. However, certain characteristics and concepts embodied in the current light infantry should be retained.

The physical and mental toughness; the excellence in basic infantry skills; and the competent, resourceful leadership that the light infantry concept provides are invaluable concepts that set the light infantry apart from other infantry units. The aura of eliteness which the light infantry carries with it should be retained in the BTR equipped light infantry. The BTR should be thought of as a carrier first and a supporting weapons platform next, never as a fighting vehicle. The vast majority of this force's training should be dismounted. In this way, the BTR equipped light infantry would still be a valuable asset for low- and mid-intensity conflicts. Most important, it would be a more capable force in the HIC/European environment.

## ENDNOTES

1. U.S. Department of the Army, Army White Paper 1984, Light Infantry Divisions, (Washington, D.C., 16 April 1984), p.1. Hereafter cited as White Paper.
2. John L. Romjue, History of Army 86, (Virginia, 1981), p. 27. The terms mobile, versatile, lethal, and deployable can be traced to the Light Infantry Division '86 study. Although the current light infantry forces never actually received a written charter using these exact words, it was, and still is, a much quicker way of stating their expectations. In fact, the term has been used in print as recently as September 1989 in LTC Peter F. Herrly's article, "Middle Weight Forces and the Army's Deployability Dilemma" in the Parameters issue of that same month.
3. White Paper, p. 1.
4. Huba Wass de Czege, "Employment Concepts For Light Infantry In Europe", NATO Interim Report, 26 August 1988. Hereafter cited as "Light Infantry In Europe." BG Wass de Czege's report is not only current, but available in a reprint format from The School Of Advanced Military Studies, Fort Leavenworth, Kansas.
5. Major William B. Caldwell, IV, "Not Light Enough To Get There, Not Heavy Enough To Win: The Case Of US Light Infantry," (Monograph, School Of Advanced Military Studies, U.S. Army Command And General Staff College, 4 December 1987). Major Caldwell covers most of the problems associated with deploying the light infantry in a high-intensity conflict in his monograph. Additionally, his bibliography has an excellent list of articles and papers written on the subjects of deploying and utilizing the light infantry.
6. Peter F. Herrly, "Middleweight Forces And The Army's Deployability Dilemma," Parameters, (September 1989), p. 59. Mr. Herrly cites specific REFORGER after action reports describing the difficulties associated with truck augmentation to light infantry units. They are dated 7 June 1988, 28 November 1988, and 20 February 1989. The Command And General Staff College policy of "non-attribution" for guest speakers prevents me from disclosing the name of the guest speaker. However, he formed this opinion mainly from his experiences during REFORGER exercises and invited anyone to review the after action reports in order to reach the same conclusion.
7. U.S. Army, Field Manual 100-5, Operations, (Washington, D.C., May 1986), p. 173.

8. Ibid., p. 12.
9. Richard E. Simpkin, Mechanized Infantry, (New York, 1980), p. 9.
10. Ibid., pp. 14-16.
11. David C. Isby, Weapons And Tactics Of The Soviet Army, (New York, 1988), p. 492.
12. Harriet F. and William F. Scott, The Armed Forces Of The USSR, (Boulder, Colorado, 1984), p. 152. See also Isby, p. 156.
13. U.S. Army, Field Manual 100-2-3, The Soviet Army, (Washington, D.C., July 1984), p. 4-33. Hereafter cited as FM 100-2-3. See also Isby, p. 39.
14. Isby, p. 171-178.
15. Ibid., p. 178.
16. Ibid., p. 41, 157.
17. Simpkin, Mechanized Infantry, p. 16.
18. Ibid., p. 28.
19. Wass de Czege, "Light Infantry In Europe," p. 1.
20. Ibid., p. C-1.
21. Isby, p. 388.
22. Huba Wass de Czege, "Three Kinds Of Infantry," Infantry, (July-August 1985), p. 11.
23. U.S. Army, Command And General Staff College, Student Text 101-1, Organizational And Tactical Reference Data For The Army In The Field, (Fort Leavenworth, KS, June 1987), p. 6-59. Hereafter cited as CGSC ST 101-1.
24. Major Richard J. Marchant, "Are Motorized Infantry Forces Essential To The United States Army?," (Monograph, School Of The Advanced Military Studies, U.S. Army Command And General Staff College, 12 January 1989), p. 22.
25. CGSC ST 101-1, p. 10-4.
26. U.S. Army, Aviation Liaison Officer's Guide, (Fort Campbell, KY, 28 January 1987), p. 2-3.



27. Ibid., p. 4-2.
28. "versatile," Webster's New Collegiate Dictionary, 1980, p. 1291.
29. Herrly, p. 48.
30. Wass de Czege, "Light Infantry In Europe," p. 8.
31. FM 100-2-3, p. 4-9. The figure of 160 armored vehicles is based on 3 motorized rifle battalions with 40 BTRs or BMPs each and 1 tank battalion with 40 tanks. This assumes that the entire motorized rifle regiment passes through the light infantry battalion's defensive sector. U.S. Army battalions are trained to expect regimental sized forces to come into their defensive sector in 2 echelons.
32. David Segal, "Army Light Infantry Divisions: Are They Fit To Fight?," Armed Forces Journal International, (October 1988), p. 82.
33. Deborah G. Meyer, "You Can't Be There Till You Get There!," Armed Forces Journal International, (July 1984), p. 81.
34. I came to this conclusion early in my career, shortly after I was commissioned and assigned to the 1st Cavalry Division at Fort Hood, Texas in 1977. The value of dismounted infantry was imbedded in my pre-commissioning training and Infantry Officer's Basic Course instruction at Fort Benning. However, when I arrived at Fort Hood, I found that commanders at every level refused to dismount infantry during any exercise. The leaders tried many innovative ways to have the infantry fight from their M113s at the expense of dismounted training. I still believe that there is a great risk of putting infantry in any vehicle and refusing to let them train in the dismounted mode. The quest for speed will always create the tendency to have infantry fight while mounted.
35. Isby, p. 172.
36. Sun Tzu, The Art Of War, trans. Samuel B. Griffith (New York, 1971), p. 84.
37. FM 100-2-3, p. 1-4. See also Isby, pp. 30-35.
38. FM 100-2-3, p. 1-4. See also Isby, p. 39.
39. Richard E. Simpkin, Tank Warfare, An Analysis of Soviet and NATO Tank Philosophy, (New York, 1979), p. 100.

40. Captain Eric R. Noyes, Research, Development and Engineering Center, U.S. Army Tank-Automotive Command, Warren, Michigan, Phone conversations on 20 November 1989 and 29 November 1989. There are no actual codified standards. This determination was made after comparing the characteristics data of the BTR against vehicles that have been tested by the Tank-Automotive Command.
41. Aleksandr Gryadunov, "APC Afloat," Soviet Military Review, (February 1988), p. 35.
42. Noyes, phone conversation.
43. Noyes, phone conversation. By comparison, the U.S. Marine Corps' Light Armored Vehicle-25 (LAV-25) has the following performance characteristics: vertical obstacle - 1.6 feet; tank ditch - 5.9 feet; slope - 30 degrees.
44. Isby, p. 174.
45. Ibid., p. 160.
46. Ibid., p. 174.
47. Ibid., p. 174.
48. Ibid., p. 419.
49. Ibid., p. 415.
50. Ibid., p. 426.
51. U.S. Air Force, Airload Planning Handout, (Fort Leavenworth, KS, October 1989).
52. Simpkin, Mechanized Infantry, p. 69.
53. U.S. Army, Field Manual 7-72, Light Infantry Battalion, (Washington D.C., March 1987), pp. 1-7 thru 1-18. This figure is based on a BTR for each infantry squad in the light infantry plus all headquarters personnel at the platoon and company level. It will take 64 BTRs in each of the 9 battalions for every soldier to be mounted.
54. Caldwell, p. 41.
55. Wass de Czege, "Light Infantry In Europe," p. 8.
56. Meyer, p. 81.

57. U.S. Army, Command and General Staff College Course P118 Text, Combat Operations, (Fort Leavenworth, KS, 1988). Enemy indications and warnings will of course determine how much time we will have before initiation of hostilities. Scenarios presented in this text provide reasonable time to deploy a BTR equipped light infantry division. Lesson 11 (p. L11-I-1) provides the most graphic example of likely indications and warnings. The scenario in this lesson allows a period of 14 days before initiation of hostilities. Lessons 5, 9, and 13 also assume a lengthy period of indications and warnings before hostilities are initiated.

58. Marchant, p. 36.

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